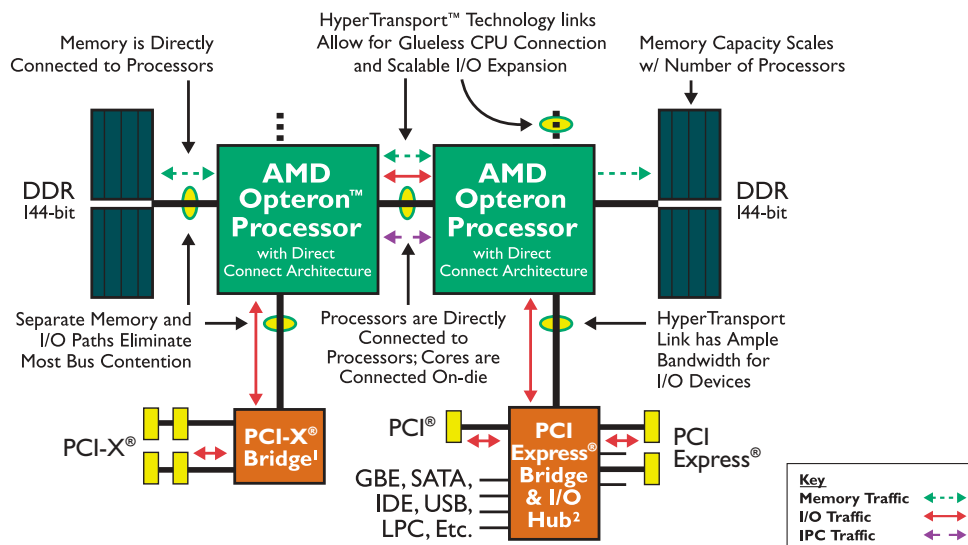




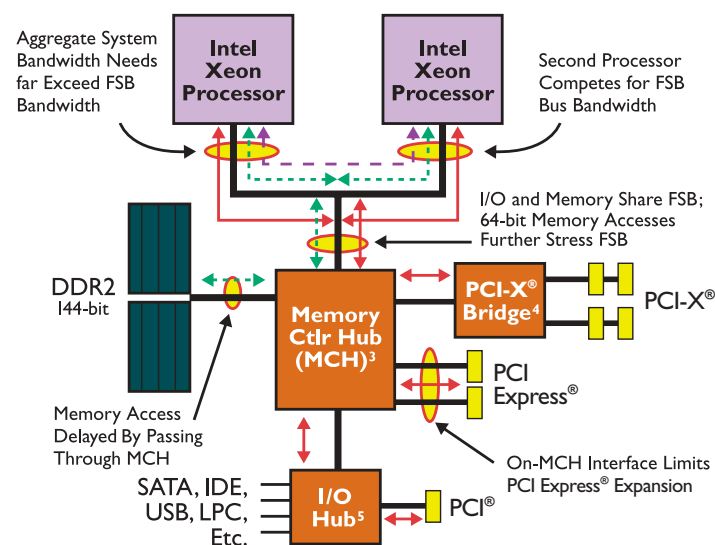
## AMD Opteron™ Processor with Direct Connect Architecture 2P Server Comparison



### AMD Opteron™ Processor-based 2P Server



### Intel Xeon Processor-based 2P Server



AMD Direct Connect Architecture	AMD Opteron™ Processor-based Server	Front Side Bus-Based Architecture	Intel Xeon Processor-based Server
	<p><b>AMD64 Architecture</b></p> <ul style="list-style-type: none"><li>Enables simultaneous high-performance 32- and 64-bit computing</li><li>Delivers industry-leading performance-per-watt capabilities compared to other x86-based architectures</li><li>AMD PowerNow!™ technology with Optimized Power Management provides power-on-demand computing and can help lower TCO</li><li>AMD's dual-core implementation enables one platform to meet the needs of multi-tasking and multi-threaded environments, providing platform longevity</li></ul> <p><b>Integrated DDR Memory Controller</b></p> <ul style="list-style-type: none"><li>Dramatically reduces latency for fast memory reads</li><li>Directly connecting memory provides a dedicated path from memory to processor</li><li>Memory bandwidth scales as processors are added</li><li>Helps eliminate need for larger caches</li></ul> <p><b>HyperTransport™ Technology</b></p> <ul style="list-style-type: none"><li>At up to 8GB/s bandwidth per link, HyperTransport provides sufficient bandwidth for supporting new and existing interconnects including Fibre Channel, Gigabit Ethernet, PCI-X<sup>®</sup>, PCI-X<sup>®</sup> 2.0, PCI Express<sup>®</sup>, Serial-ATA, Serial Attached SCSI and I0G Ethernet</li></ul>		<p><b>EM64T Technology</b></p> <ul style="list-style-type: none"><li>Allows simultaneous 32- and 64-bit computing</li><li>Memory addressability limited to 36-bit</li><li>Demand Based Switching</li></ul> <p><b>“Northbridge”-style Memory Controller via Front Side Bus</b></p> <ul style="list-style-type: none"><li>Passage through memory controller hub delays memory reads</li><li>Processors compete for FSB bandwidth</li><li>Memory and I/O must share FSB bandwidth, further reducing the efficiency of the FSB</li></ul> <p><b>Multiple Hub I/O Buses</b></p> <ul style="list-style-type: none"><li>With one MCH per system, PCI Express<sup>®</sup> interface integration onto MCH limits expansion options</li><li>I/O Hub interface bus can be overloaded by the aggregate demands of its many I/O devices</li></ul>

<sup>1</sup> AMD-8132™ HyperTransport PCI-X<sup>®</sup> Tunnel

<sup>2</sup> NVIDIA nForce Professional 2200

<sup>3</sup> Intel E7525 Chipset Memory Controller Hub (MCH)

<sup>4</sup> Intel 6700PXH 64-bit PCI<sup>®</sup>/PCI-X<sup>®</sup> Controller Hub

<sup>5</sup> Intel 82801ER I/O Controller Hub (ICH5)

Server System Comparison	AMD Opteron™	Intel Xeon <sup>1</sup>	Intel Xeon <sup>2</sup>	Intel Xeon MP <sup>3</sup>	Intel Itanium 2 <sup>4</sup>
Modular, glueless scalability	Yes	Requires Northbridge	Requires Northbridge	Requires Northbridge	Requires Northbridge
SMP Capabilities	Up to 8-way	Up to 2-way	Up to 2-way	Up to 4-way	Up to 4-way
Direct Connect Architecture	Yes	No	No	No	No
Dual-Core technology	Yes	No	No	No	No
High Performance 32-bit and 64-bit computing	AMD64	No	EM64T	EM64T	No
HyperTransport™ technology	Yes	No	No	No	No
Integrated DDR memory controller	Yes	No	No	No	No
Front Side Bus frequency	1.4 – 2.6GHz <sup>†</sup>	533MHz	800MHz	667MHz	400MHz
Front Side Bus bandwidth	11.2 – 20.8GB/s <sup>†</sup>	4.3GB/s	6.4GB/s	10.6GB/s	6.4GB/s
Maximum Inter-processor bandwidth	8.0GB/s	4.3GB/s	6.4GB/s	10.6GB/s	6.4GB/s
Memory support	DDR200/266/333/400	DDR266	DDR333/DDR2-400	DDR266/333/DDR2-400	DDR200
Memory Bandwidth 2P System	12.8GB/s <sup>††</sup>	4.3GB/s	6.4GB/s	12.8GB/s	6.4GB/s
Memory Bandwidth 4P System	25.6GB/s <sup>†††</sup>	N/A	N/A	12.8GB/s	6.4GB/s
L1 cache size (max.)	64KB (Data) + 64KB (Instruction) per core	8KB + 12k mop	16KB + 12k mop	16KB + 12k mop	32KB
L2 cache size (max.)	1MB per core	512KB	2MB	1MB	256KB
L3 cache size (max.)	N/A	2MB	N/A	8MB	9MB
Maximum I/O bandwidth 2P System	24.0GB/s <sup>††</sup>	3.2GB/s	12.3GB/s	14.0GB/s	6.4GB/s
Maximum I/O bandwidth 4P System	32.0GB/s <sup>†††</sup>	N/A	N/A	14.0GB/s	6.4GB/s
SIMD Instruction Set Support	SSE, SSE2, SSE3	SSE, SSE2	SSE, SSE2, SSE3	SSE, SSE2, SSE3	N/A

## Dedicated Bandwidth

## Shared Bandwidth

<sup>†</sup>The front side bus (interface to memory) of the AMD Opteron™ processor runs at the speed of the processor

<sup>††</sup>AMD 2P System – AMD Opteron 200 Series with 1 HyperTransport™ Inter-processor Bus and 3 HyperTransport I/O Buses with DDR400 memory

<sup>†††</sup>AMD 4P System – AMD Opteron 800 Series with 4 HyperTransport Inter-processor Buses and 4 HyperTransport I/O Buses with DDR400 memory

<sup>1</sup>With Intel E7501 Chipset (<http://developer.intel.com/products/chipsets/e7501/index.htm>)

<sup>2</sup>With Intel E7520 Chipset ([http://developer.intel.com/products/chipsets/e7520\\_e7320/index.htm](http://developer.intel.com/products/chipsets/e7520_e7320/index.htm))

<sup>3</sup>With Intel E8500 Chipset (<http://developer.intel.com/products/chipsets/e8500/index.htm>)

<sup>4</sup>With Intel E8870 Chipset (<http://developer.intel.com/products/chipsets/e8870/index.htm>)

Access 2P server comparison information online at:

<http://www.amd.com/servercomparison>

## About AMD

AMD (NYSE:AMD) designs and produces innovative microprocessors, Flash memory devices, and low-power processor solutions for the computer, communications, and consumer electronics industries. AMD is dedicated

to delivering standards-based, customer-focused solutions for technology users, ranging from enterprises and governments to individual consumers. For more information visit [www.amd.com](http://www.amd.com).



[www.amd.com](http://www.amd.com)

One AMD Place  
P.O. Box 3453,  
Sunnyvale, CA 94088-3453, USA  
Tel: 408-749-4000 or 800-538-8450  
TWX: 910-339-9280  
TELEX: 34-6306

## Technical Support

USA & Canada: 800-222-9323 or 408-749-5703

USA & Canada PC Microprocessor:

408-749-3060

USA & Canada Email: [hw.support@amd.com](mailto:hw.support@amd.com)

Latin America Email: [latinamerica.support@amd.com](mailto:latinamerica.support@amd.com)

Europe & UK: +44-0-1276-803299

Fax: +44-0-1276-803298

France: 0800-908-621

Germany: +49-89-450-53199

Italy: 800-877224

Europe Email: [euro.tech@amd.com](mailto:euro.tech@amd.com)

Far East Fax: 852-2956-0588

Japan Fax: 81-3-3346-7848

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